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SOLAR/1025-79/05

Monthly Performance Report

HELIO THERMICS, INC. - LOT 6

MAY 1979

U.S. Department of Energy

National Solar Heating and Cooling Demonstration Program

National Solar Data Program

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MONTHLY PERFORMANCE REPORT

HELIO-THERMICS, INC.
HOUSE LOT 6

MAY 1979

I. SYSTEM DESCRIPTION

Helio-Thermics Inc., House Lot 6 is one of two instrumented single-family residences in Greenville, South Carolina. The home has approximately 1086 square feet of conditioned space. Solar energy is used for space heating the home and preheating domestic hot water (DHW). The solar energy system utilizes the attic space as the solar energy collector. The attic roof faces 10 degrees west of south and is pitched at an angle of 51 degrees from the horizontal. Solar energy enters the attic through a 416-square-foot aperture which is double-glazed with corrugated, translucent, fiberglass-reinforced, acrylic panels. The interior of the attic is painted black to maximize the absorption of solar energy. Warm air accumulates in the peak of the attic roof and circulates through the conditioned space or through storage by an air handler. Solar energy is stored in an 870-cubic-foot storage bin containing 85,460 pounds of crushed rock. The bin is located under the house and is insulated with 2-inch polystyrene insulation. Cold water is preheated in the attic by thermosiphoning water from the 80-gallon preheat tank through a manifold system of copper tubes. These tubes are attached to black sheet-metal plates, thus enhancing absorption of solar radiation for preheating the water as it circulates to and from the preheat tank. Preheated city water is stored in the preheat tank and supplied, on demand, to a conventional 80-gallon DHW tank. When solar energy is insufficient to satisfy the space heating load, a water-to-air heat exchanger in the hot air supply-duct provides auxiliary energy for space heating. A gas-fired water heater provides auxiliary energy for the water-to-air heat exchanger and the DHW. The system, shown schematically in Figure 1, has seven modes of operation.

Mode 1 - Collector-to-Storage: This mode activates when there is no demand for space heating and the collector supply-duct temperature is 26°F higher than the storage temperature. This mode terminates when the temperature difference between the collector and storage is less than 16°F.

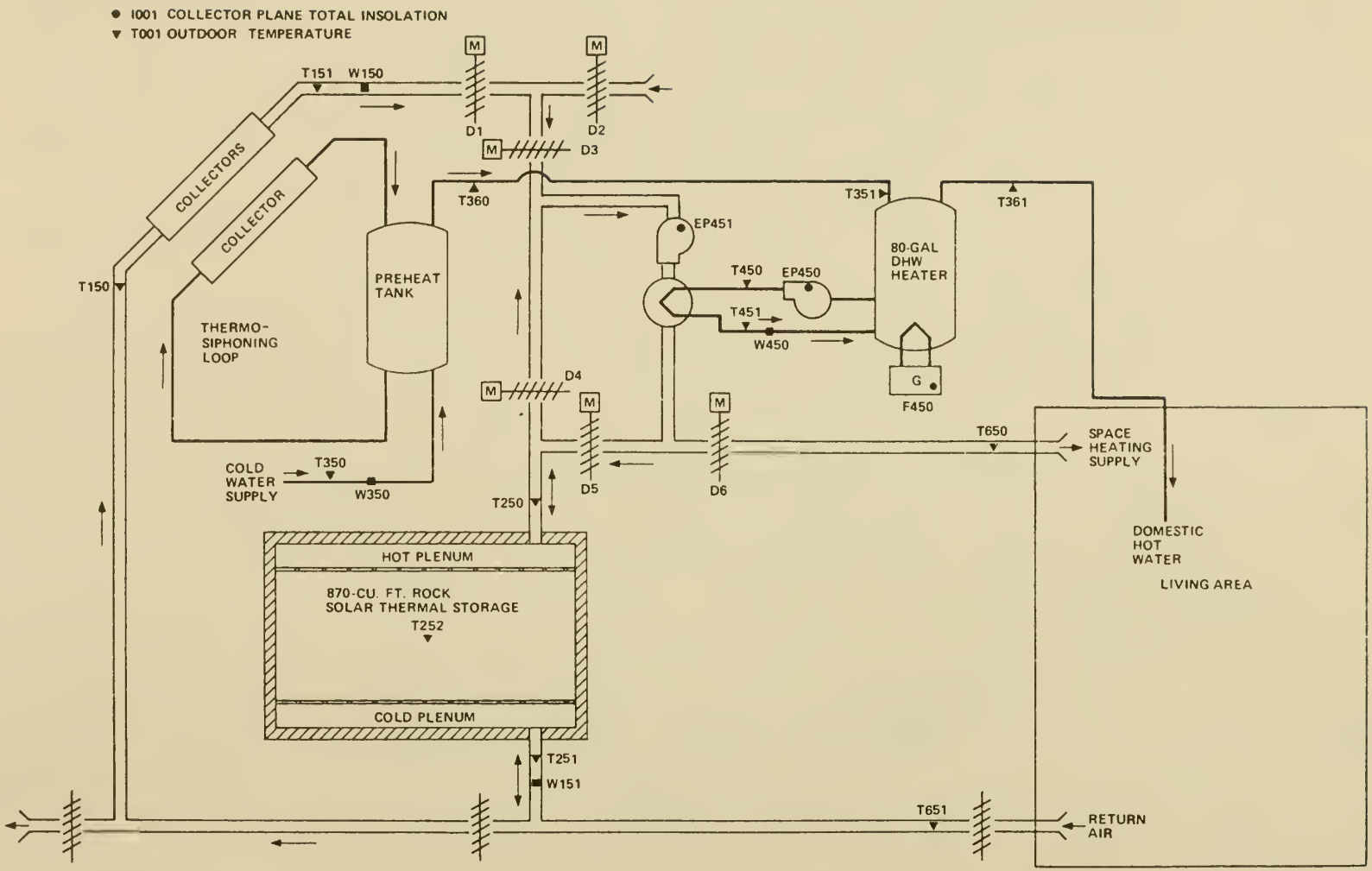

Figure 1. HELIO THERMICS, INC., LOT NO. 6, SOLAR ENERGY SYSTEM SCHEMATIC

Mode 2 - Storage-to-Space Heating: This mode activates when space heating is required (but is not available from the collector) and the storage temperature exceeds the building ambient temperature by 5°F. This mode terminates when the building ambient temperature equals the storage temperature or when space heating is no longer required.

Mode 3 - Collector-to-Space Heating: This mode activates when space heating is required and the collector supply-duct air temperature is 10°F higher than the building ambient air temperature. This mode terminates when the temperature difference drops to less than 6°F or the space heating requirement is satisfied.

Mode 4 - Auxiliary Energy-to-Space Heating: This mode activates when space heating is required and thermal energy is not available from the collectors or storage. An electrical heating element in the hot air supply-duct remains on until the space heating demand is satisfied.

Mode 5 - Summer Mode, Passive Cooling Storage: This mode can be activated when the residents wish to store cool air in storage for circulation the next day. The air-handler fan activates and an outside air-intake damper opens to allow the cool air to circulate through the attic and storage.

Mode 6 - Summer Mode, Space Cooling: This mode can be activated when cool air from storage is desired in the living area. The outside air-intake damper closes, the duct to the living area opens, and the air-handler fan activates.

Mode 7 - DHW Preheating: This mode activates when there is a demand for hot water. Water is drawn from the conventional DHW tank and replenished with heated water from the preheat tank. The DHW subsystem has this one independent mode of operation for preheating.

II. PERFORMANCE EVALUATION

INTRODUCTION

Although the site was occupied during May, no attempt was made to collect or store solar energy. The DHW thermosiphoning system provided 0.52 million Btu of solar energy to the hot water load of 1.3 million Btu.

There was a space heating demand of 0.32 million Btu which was primarily satisifed with auxiliary thermal energy and only a negligible quantity of solar energy. The thermal energy provided by conventional methods to satisfy the conditioned space heating load also circulates through storage and, in effect, heats the storage bin. The same relatively low storage temperatures, however, provided a source for cool air during the warm daytime hours. Because of the fluctuating temperature, which results in a heating load during the night and a cooling load during the day, the system has not been fully converted to a summer mode of operation. In a full summer mode, the heating requirements are assumed to be insignificant (until fall) and cool air is intentionally transferred to storage during the night for daytime use.

WEATHER CONDITIONS

During the month, total incident solar energy on the collector array was 17.4 million Btu for a daily average of 1351 Btu per square foot. This was below the estimated average daily solar radiation for this geographical area during May of 1438 Btu per square foot for a south-facing plane with a tilt of 51 degrees to the horizontal. The average ambient temperature during May was 67°F as compared with the long-term average for May of 69°F.

THERMAL PERFORMANCE

Collector - The total incident solar radiation on the colector array for the month of May was 17.4 million Btu, although no attempt was made to collect or store solar energy during this period.

Storage - Solar energy was not delivered to storage, although air from the living area was circulated through the relatively cool storage bin to provide cooler inside ambient air. Therefore, the thermal energy mass in storage was intentionally reduced by 0.60 million Btu. This quantity appears as a negative value in the "transferral from" column of the attached report (see Storage Performance). The average storage temperature for the month was 71°F.

DHW Load - The DHW subsystem consumed 0.52 million Btu of solar energy and at least 0.78 million Btu of auxiliary fossil fuel energy to satisfy a hot water load of 1.30 million Btu. Losses from the DHW subsystem are unknown. The DHW theroasiphoning subsystem does not consume operating energy, resulting in a fossil fuel energy savings of 0.87 million Btu. A daily average of 70 gallons of DHW was consumed at an average temperature of 142°F delivered from the tank.

Space Heating Load - The space heating subsystem consumed a negligible quantity of solar energy and 0.53 million Btu of auxiliary fossil fuel energy to satisfy a space heating load of 0.32 million Btu. The space heating subsystem consumed a total of 0.06 million Btu of operating energy.

OBSERVATIONS

The gas flow totalizer used to quantify the gas consumption is not providing valid data. The measurement of auxiliary thermal energy consumption in the DHW subsystem will not be available until the problem is corrected.

ENERGY SAVINGS

The solar energy system provided a fossil fuel energy savings of 0.88 million Btu at an electrical energy operating expense of 0.012 million Btu.

III. ACTION STATUS

Boeing will replace the gas totalizer before the next heating season.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/05
REPORT PERIOD: MAY,1979

SITE/SYSTEM DESCRIPTION:
THE HELIOTHERMICS SOLAR ENERGY SYSTEM PROVIDES SPACE HEATING AND DOMESTIC HOT WATER PREHEATING. IN THE SPACE HEATING SUBSYSTEM, THERMAL ENERGY IS TRANSFERRED BY AIR CIRCULATION FROM THE ATTIC TO THE LOAD OR TO CRUSHED ROCK IN AN INSULATED CONCRETE BIN. IN THE DOMESTIC HOT WATER SUBSYSTEM, SOLAR ENERGY IS COLLECTED FROM A 70 SQ. FT ALUMINUM AND COPPER PADDLE IN THE ATTIC AND TRANSFERRED TO AN 80 GAL. PREHEAT TANK BY THERMOSIPHONING. AUXILIARY ENERGY IS PROVIDED TO BOTH SUBSYSTEMS BY A COMMON NATURAL GAS WATER HEATER.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	17.421	MILLION BTU
	41877	BTU/SQ.FT.
COLLECTED SOLAR ENERGY	0.000	MILLION BTU
	0	BTU/SQ.FT.
AVERAGE AMBIENT TEMPERATURE	67	DEGREES F
AVERAGE BUILDING TEMPERATURE	75	DEGREES F
ECSS SOLAR CONVERSION EFFICIENCY	0.03	
ECSS OPERATING ENERGY	0.000	MILLION BTU
TOTAL SYSTEM OPERATING ENERGY	0.022	MILLION BTU
TOTAL ENERGY CONSUMED	*	MILLION BTU

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL	
LOAD	1.299	0.320	N.A.	1.619	MILLION BTU
SOLAR FRACTION	*	0	N.A.	*	PERCENT
SOLAR ENERGY USED	0.524	0.002	N.A.	0.526	MILLION BTU
OPERATING ENERGY	N.A.	0.022	N.A.	0.022	MILLION BTU
AUX. THERMAL ENERGY	*	0.318	N.A.	*	MILLION BTU
AUX. ELECTRIC FUEL	N.A.	N.A.	N.A.	N.A.	MILLION BTU
AUX. FOSSIL FUEL	*	0.530	N.A.	*	MILLION BTU
ELECTRICAL SAVINGS	N.A.	0.026	N.A.	0.025	MILLION BTU
FOSSIL SAVINGS	0.874	0.003	N.A.	0.875	MILLION BTU

SYSTEM PERFORMANCE FACTOR: *

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/05
REPORT PERIOD: MAY,1979

SITE/SYSTEM DESCRIPTION:
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GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	18.379	GIGA JOULES
	475560	KJ/SQ.M.
COLLECTED SOLAR ENERGY	0.000	GIGA JOULES
	5	KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	19	DEGREES C
AVERAGE BUILDING TEMPERATURE	24	DEGREES C
ECSS SOLAR CONVERSION EFFICIENCY	0.03	
ECSS OPERATING ENERGY	0.000	GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	0.023	GIGA JOULES
TOTAL ENERGY CONSUMED	*	GIGA JOULES

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL	
LOAD	1.371	0.337	N.A.	1.708	GIGA JOULES
SOLAR FRACTION	*	0	N.A.	*	PERCENT
SOLAR ENERGY USED	0.553	0.002	N.A.	0.555	GIGA JOULES
OPERATING ENERGY	N.A.	0.023	N.A.	0.023	GIGA JOULES
AUX. THERMAL ENG	*	0.336	N.A.	*	GIGA JOULES
AUX. ELECTRIC FUEL	N.A.	N.A.	N.A.	N.A.	GIGA JOULES
AUX. FOSSIL FUEL	*	0.560	N.A.	*	GIGA JOULES
ELECTRICAL SAVINGS	N.A.	0.028	N.A.	0.028	GIGA JOULES
FOSSIL SAVINGS	0.922	0.003	N.A.	0.925	GIGA JOULES

SYSTEM PERFORMANCE FACTOR: *

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/05
REPORT PERIOD: MAY,1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	0.847	61	0.032	N	0.000	N	0.038
2	0.813	64	0.032	O	0.000	O	0.039
3	0.293	66	0.010	T	0.000	T	0.035
4	0.462	70	0.008		0.000		0.018
5	0.410	66	0.011	A	0.000	A	0.026
6	0.371	63	0.009	P	0.000	P	0.023
7	0.386	68	0.015	P	0.000	P	0.039
8	0.356	70	0.014	L	0.000	L	0.040
9	0.247	69	0.009	I	0.000	I	0.036
10	0.506	73	0.019	C	0.000	C	0.037
11	0.643	74	0.005	A	0.000	A	0.007
12	0.669	69	0.004	B	0.000	B	0.006
13	0.454	69	0.008	L	0.000	L	0.018
14	0.845	66	0.030	E	0.000	E	0.035
15	0.962	70	0.016		0.000		0.017
16	0.801	66	0.013		0.000		0.016
17	0.815	63	0.047		0.000		0.058
18	0.834	62	0.010		0.000		0.012
19	0.632	65	0.030		0.000		0.047
20	0.660	70	0.025		0.000		0.038
21	0.386	69	0.017		0.000		0.043
22	0.381	71	0.003		0.000		0.008
23	0.219	69	0.015		0.000		0.067
24	0.510	67	0.008		0.000		0.015
25	0.739	56	0.018		0.000		0.024
26	0.837	55	0.037		0.000		0.044
27	0.374	58	0.013		0.000		0.035
28	0.750	68	0.020		0.000		0.026
29	0.357	66	0.017		0.000		0.049
30	0.562	70	0.022		0.000		0.039
31	0.297	70	0.010		0.000		0.033
SUM	17.421	-	0.526	N.A.	0.000	N.A.	-
AVG	0.562	67	0.017	N.A.	0.000	N.A.	0.030
NBS ID	0001	N113			Q102		N111

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
COLLECTOR ARRAY PERFORMANCE

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/05
REPORT PERIOD: MAY,1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	0.847	0.005	0.000	75	0.000
2	0.813	0.011	0.000	77	0.000
3	0.293	0.000	0.000	71	0.000
4	0.462	0.000	0.000	77	0.000
5	0.410	0.000	0.000	73	0.000
6	0.371	0.000	0.000	68	0.000
7	0.386	0.000	0.000	72	0.000
8	0.356	0.000	0.000	76	0.000
9	0.247	0.000	0.000	*	0.000
10	0.506	0.000	0.000	77	0.000
11	0.643	0.000	0.000	87	0.000
12	0.669	0.000	0.000	*	0.000
13	0.454	0.000	0.000	*	0.000
14	0.845	0.000	0.000	76	0.000
15	0.962	0.000	0.000	78	0.000
16	0.801	0.000	0.000	75	0.000
17	0.815	0.000	0.000	73	0.000
18	0.834	0.000	0.000	75	0.000
19	0.632	0.000	0.000	83	0.000
20	0.660	0.000	0.000	79	0.000
21	0.386	0.000	0.000	75	0.000
22	0.381	0.000	0.000	76	0.000
23	0.219	0.000	0.000	72	0.000
24	0.510	0.000	0.000	74	0.000
25	0.739	0.000	0.000	64	0.000
26	0.837	0.000	0.000	68	0.000
27	0.374	0.000	0.000	71	0.000
28	0.750	0.000	0.000	*	0.000
29	0.357	0.000	0.000	69	0.000
30	0.562	0.000	0.000	81	0.000
31	0.297	0.000	0.000	73	0.000
SUM	17.421	0.016	0.000	-	-
AVG	0.562	0.001	0.000	75	0.000
NBSID	Q001		Q100		N100

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCE

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/05
REPORT PERIOD: MAY,1979

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	0.000	-0.026	0.004	68	1.000
2	0.000	-0.033	0.010	68	1.000
3	0.000	-0.014	0.006	69	1.000
4	0.000	-0.015	0.025	70	1.000
5	0.000	0.000	-0.006	71	1.000
6	0.000	-0.005	0.004	71	1.000
7	0.000	-0.005	0.004	71	1.000
8	0.000	-0.019	0.008	71	1.000
9	0.000	-0.011	0.011	72	1.000
10	0.000	-0.029	0.017	72	1.000
11	0.000	-0.045	-0.002	73	1.000
12	0.000	-0.010	-0.021	73	1.000
13	0.000	-0.021	0.013	72	1.000
14	0.000	-0.039	-0.004	73	1.000
15	0.000	-0.018	-0.026	71	1.000
16	0.000	-0.036	0.008	72	1.000
17	0.000	-0.008	-0.008	71	1.000
18	0.000	-0.042	-0.002	71	1.000
19	0.000	-0.014	0.004	71	1.000
20	0.000	-0.018	0.017	71	1.000
21	0.000	-0.019	0.004	72	1.000
22	0.000	-0.030	0.032	73	1.000
23	0.000	-0.013	0.008	74	1.000
24	0.000	0.000	-0.013	74	1.000
25	0.000	-0.043	-0.042	73	1.000
26	0.000	-0.010	-0.011	71	1.000
27	0.000	-0.006	-0.019	70	1.000
28	0.000	-0.027	0.015	70	1.000
29	0.000	0.000	0.008	71	1.000
30	0.000	-0.025	0.021	71	1.000
31	0.000	-0.014	0.015	73	1.000
SUM	0.000	-0.597	0.090	-	-
AVG	0.000	-0.019	0.003	71	1.000
NBS ID	Q200	Q201	Q202		N108

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
HOT WATER SUBSYSTEM

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC — SOLAR/1025-79/05
REPORT PERIOD: MAY,1979

DAY OF MON.	HOT WATER LOAD MILLION BTU	SOLAR FR.OF LOAD PER CENT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	SUP. WAT. TEMP DEG F	HOT WAT. TEMP DEG F	HOT WATER USED GAL
1	0.049	*	0.032	NOT APPLICABLE	*	NOT APPLICABLE	*	NOT APPLICABLE	0.054	69	143	76
2	0.041	*	0.032		*		*		0.053	74	140	73
3	0.044	*	0.010		*		*		0.017	73	142	70
4	0.028	*	0.008		*		*		0.013	75	143	47
5	0.023	*	0.011		*		*		0.018	73	138	38
6	0.025	*	0.009		*		*		0.014	71	145	38
7	0.048	*	0.015		*		*		0.025	74	146	75
8	0.074	*	0.014		*		*		0.024	75	146	119
9	0.042	*	0.009		*		*		0.015	73	140	72
10	0.042	*	0.019		*		*		0.031	75	145	76
11	0.007	*	0.005		*		*		0.008	75	141	14
12	0.009	*	0.004		*		*		0.007	77	143	15
13	0.014	*	0.008		*		*		0.014	77	140	25
14	0.033	*	0.030		*		*		0.049	74	140	62
15	0.031	*	0.016		*		*		0.027	72	142	47
16	0.015	*	0.013		*		*		0.022	72	148	25
17	0.068	*	0.047		*		*		0.078	74	142	126
18	0.013	*	0.010		*		*		0.017	73	139	22
19	0.070	*	0.030		*		*		0.050	78	138	108
20	0.037	*	0.025		*		*		0.041	76	137	77
21	0.077	*	0.017		*		*		0.028	76	142	131
22	0.023	*	0.003		*		*		0.005	76	142	41
23	0.104	*	0.015		*		*		0.024	76	145	165
24	0.011	*	0.008		*		*		0.013	73	144	19
25	0.038	*	0.018		*		*		0.030	70	144	56
26	0.071	*	0.036		*		*		0.060	68	148	109
27	0.044	*	0.013		*		*		0.022	69	144	60
28	0.025	*	0.020		*		*		0.033	74	138	49
29	0.047	*	0.017		*		*		0.029	75	138	77
30	0.079	*	0.022		*		*		0.037	76	146	130
31	0.069	*	0.010		*		*		0.016	76	145	114
SUM	1.299	-	0.524	N.A.	*	N.A.	*	N.A.	0.874	-	-	2158
AVG	0.042	*	0.017	N.A.	*	N.A.	*	N.A.	0.028	74	142	70
NBS	Q302	N300	Q300	Q303	Q301	Q305	Q306	Q311	Q313	N305	N307	N308

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SPACE HEATING SUBSYSTEM

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/05
REPORT PERIOD: MAY,1979

DAY OF MON.	SPACE HEATING LOAD MILLION BTU	SOLAR FR.OF LOAD PCT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	BLDG TEMP DEG. F	AMB TEMP DEG. F
1	0.030	0	0.000	0.000	0.029	N	0.049	0.004	0.000	72	61
2	0.009	1	0.000	0.000	0.009	O	0.016	0.002	0.000	73	64
3	0.004	0	0.000	0.000	0.004	T	0.007	0.001	0.000	74	66
4	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	76	70
5	0.000	0	0.000	0.000	0.000	A	0.000	0.000	0.000	74	66
6	0.006	0	0.000	0.000	0.006	P	0.010	0.001	0.000	73	63
7	0.006	0	0.000	0.000	0.006	P	0.010	0.001	0.000	75	68
8	0.000	0	0.000	0.000	0.000	L	0.000	0.000	0.000	76	70
9	0.000	0	0.000	0.000	0.000	I	0.000	0.000	0.000	76	69
10	0.000	0	0.000	0.000	0.000	C	0.000	0.000	0.000	77	73
11	0.000	0	0.000	0.000	0.000	A	0.000	0.000	0.000	77	74
12	0.000	0	0.000	0.000	0.000	B	0.000	0.000	0.000	76	69
13	0.000	0	0.000	0.000	0.000	L	0.000	0.000	0.000	75	69
14	0.000	0	0.000	0.000	0.000	E	0.000	0.000	0.000	74	66
15	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	74	70
16	0.020	0	0.000	0.000	0.020		0.033	0.003	0.000	74	66
17	0.011	0	0.000	0.000	0.011		0.018	0.002	0.000	72	63
18	0.036	0	0.000	0.005	0.036		0.061	0.001	0.000	73	62
19	0.012	0	0.000	0.000	0.012		0.020	0.002	0.000	74	65
20	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	75	70
21	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	76	69
22	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	76	71
23	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	76	69
24	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	75	67
25	0.049	0	0.000	0.003	0.049		0.081	0.004	0.000	72	56
26	0.069	2	0.001	0.011	0.068		0.113	-0.001	0.002	72	55
27	0.041	0	0.000	0.003	0.041		0.068	0.003	0.000	73	58
28	0.013	0	0.000	0.000	0.013		0.022	0.002	0.000	75	68
29	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	75	66
30	0.014	0	0.000	0.000	0.014		0.023	0.002	0.000	76	70
31	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	77	70
SUM	0.320	-	0.002	0.022	0.318	N.A.	0.530	0.026	0.003	-	-
AVG	0.010	0	0.000	0.001	0.010	N.A.	0.017	0.001	0.000	75	67
NBS	Q402	N400	Q400	Q403	Q401		Q410	Q415	Q417	N406	N113

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/05
REPORT PERIOD: MAY,1979

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	2037	N	61	75	N	N	N
2	1955	O	64	77	O	O	O
3	705	T	66	71	T	T	T
4	1110		70	77			
5	986	A	66	73	A	A	A
6	893	P	63	68	P	P	P
7	928	P	68	72	P	P	P
8	855	L	70	76	L	L	L
9	593	I	69	*	I	I	I
10	1217	C	73	77	C	C	C
11	1547	A	74	87	A	A	A
12	1609	B	69	*	B	B	B
13	1092	L	69	*	L	L	L
14	2032	E	66	76	E	E	E
15	2313		70	78			
16	1926		66	75			
17	1960		63	73			
18	2004		62	75			
19	1519		65	83			
20	1586		70	79			
21	928		69	75			
22	916		71	76			
23	525		69	72			
24	1227		67	74			
25	1776		56	64			
26	2011		55	68			
27	899		58	71			
28	1802		68	*			
29	858		66	69			
30	1351		70	81			
31	715		70	73			
SUM	41877	N.A.	-	-	-	-	-
AVG	1351	N.A.	67	75	N.A.	N.A.	N.A.
NBS ID	Q001		N113			N115	N114

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
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